Astrid Boje | Curriculum Vitae

Churchill College, Storeys Way, Cambridge, Cambridgeshire, CB3 0DS

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Graduate chemical engineer with a dual masters in mathematics and scientific computing. Currently a Ph.D. student in the Computational Modelling group at the University of Cambridge, working with stochastic methods for solving population balance equations.

Experience

Work experience

- **Helmholtz Zentrum Dresden Rossendorf** — **Dresden, Germany**
  Intern in Experimental Thermal Fluid Dynamics — *2014*
  3 month internship developing a 1D, dynamic, multicomponent, compartment model for a slurry bubble column reactor for Fischer-Tropsch synthesis.

- **Mintek** — **Johannesburg, South Africa**
  Graduate Engineer in Measurement and Control — *2013*
  Researched viability of thickener control. Documented models developed for the in-house control framework (written in C++). Contributed to on-site testing and data analysis for a flotation reagent controller.

- **Mintek** — **Johannesburg, South Africa**
  Engineering intern in Measurement and Control — *2011–2012*
  8 week internship developing a temperature-dependent amperometry model to be incorporated in a commercial cyanide measurement device.

Teaching experience

- **University of Cambridge** — **Cambridge, United Kingdom**
  Supervisor for Partial Differential Equations Course — *2019*
  Small-group teaching and tutorials for students in the Part IIA year of the Chemical Engineering Tripos.

Academic qualifications

- **Churchill College, University of Cambridge** — **Cambridge, United Kingdom**
  Ph.D. Chemical Engineering — *2015–Current*
  Develop Monte Carlo methods (in-house code written in C++) to solve population balance equations for studying combustion synthesis of inorganic nanoparticles. Proposed reactor model for titanium dioxide synthesis and numerical algorithms to improve performance of the stochastic solver under industrial conditions.
  Supervisor: Prof. Dr. Markus Kraft.

- **Technical University of Berlin (TUB)** — **Berlin, Germany**
  M.Sc. Scientific Computing, 1.2, "Sehr Gut" — *2014–2015*
  Coursework covered control theory, differential algebraic equations, optimal control of partial differential equations, and model order reduction. Thesis on convergence of stochastic coagulating particle systems with Weierstrass Institute of Applied Analysis and Stochastics (WIAS).
  Supervisors: Dr. Robert Patterson (WIAS) and Prof. Dr. Wolfgang König (TUB, WIAS).

- **Royal Institute of Technology (KTH)** **Stockholm, Sweden**
  M.Sc. Mathematics, A, "Excellent" *2013–2014*
  Coursework covered stochastic differential equations, parallel and high-performance computing, fast numerical algorithms, mathematical modelling, finite element and finite volume methods, and non-linear optimisation.

- **University of Cape Town (UCT)** **Cape Town, South Africa**
  B.Sc. Eng. Hons. (Chemical Engineering), First Class *2009–2012*
  Coursework included mathematics, physics, chemistry, thermodynamics, numerical methods, process design, modelling, and control, as well as post-graduate level coursework in optimisation. Honours project modelling Fischer Tropsch synthesis.
  Supervisor: Prof. Dr. Klaus Moller.

Technical and personal skills

- **Programming Languages:** MATLAB/SCILAB, PYTHON, and C++. Basic proficiency with MPI/OpenMP and parallel programming.
- **Simulation software:** ASPEN HYSYS, COMSOL MULTIPHYSICS, waLBERLA (Lattice-Boltzmann solver for fluid dynamics).
- **General:** Linux, Microsoft Windows, LaTeX, Git.

Interests and extra-curricular activity

- **Cambridge University Ballet Club** (2015–2016, 2018–2019). Performed in Don Quixote.
- **Churchill College Boat Club** (2015–2016, 2018–2019). Rowed in women's second boat, 2015–2016. Sub for women's first and second boats, 2018–2019.

Achievements

- **Cambridge University Ph.D. Studentships** *2016–2019*
  Cambridge Centre for Advanced Research and Education in Singapore (CARES)
  Chemical Engineering and Biotechnology Department
- **COSSE Double Masters Programme** *2013–2015*
  Erasmus Mundus Scholarship
- **Mintek** *2011–2012*
  Undergraduate Bursary
- **University of Cape Town, Faculty of Engineering** *2010–2012*
  Dean's Merit List
- **University of Cape Town, Faculty of Engineering** *2009*
  Entrance Scholarship
- **Independent Examinations Board (IEB)** *2008*
  Top 40 IEB Matriculants in South Africa
- **Our Lady of Fatima Convent School** *2008*
  Matric DUX student and subject trophies: English, Afrikaans, Bilingualism, Physics, Biology, Mathematics and Physics, History, Life Orientation
- **Kwa-Zulu Natal Youth Dance Company** *2006–2008*
  Provincial ballet dancer.

Languages

- **English**: First language
- **Afrikaans**: Intermediate proficiency
- **Italian**: A1&2 CEFR certificate
- **German**: Basic proficiency
- **Swedish**: Basic proficiency

Publications

- Boje, A., Akroyd, J., Kraft, M., 2018. A hybrid particle-number and particle model for efficient solution of population balance equations. Submitted for publication.
- Boje, A., Akroyd, J., Sutcliffe, S., Edwards, J., Kraft, M., 2017. Detailed population balance modelling of TiO_2 synthesis in an industrial reactor. Chemical Engineering Science 164, 219–231. doi: 10.1016/j.ces.2017.02.019.

Conference talks

- Boje, A., Akroyd, J., Kraft, M., 2018. Numerical study of the evolution of particle size and morphology in an industrial titanium dioxide reactor. American Institute of Chemical Engineers (AIChE) Annual Meeting.

Conference posters

- Boje, A., Kraft, M., 2017. Computational study of temperature effects in TiO2 synthesis in an industrial reactor. Cambridge Particle Meeting.